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Research on Information System Integration in Colleges Based on SOA

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Abstract

Digital campus is the target for information construction in institutions of higher learning. With the growing thoroughness of the college information application, the problems of information isolated island and application isolated island are becoming more and more serious. This paper introduced the basic concepts and key technologies of SOA. In addition, it has given rise to the realization of the information system in the university based on the SOA Architecture.

Keywords: Information isolated island; SOA; system integration

1. Introduction

"The 2006-2020 national information development strategy" points out that information has been the great tendency for the current world economic and social development. The education information is an important composite part for the national economy and the social information. With the guidance of the development strategy, after 10 years of hard work, different functional departments within the colleges and universities have built a development platform according to their requirements. In addition, they have built the information systems of which the languages are various with an aim to satisfy the requirements of their functions. The information in institutions of higher learning has achieved great accomplishments, yet in spite of which certain problems have occurred due to the following reasons: there is a lack of strategies and directions that should have considered the overall situation at the initial stage of construction; there is a lack of unified standards; the information systems among each functional department and each institution are independent to each other; therefore, the data and information fail to make fine sharing and exchanges. The above listed problems have resulted in the situation that each

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information system goes in its own way without coordination. They have formed into the embarrassing situation that each is a single "information isolated island". With the continuous thoroughness of the information application, the requirements of interaction between the institutions of higher learning and the exterior information, and within the institutions of higher learning are becoming more and more severe. The integration on the existing information is in urgent need so as to connect the "information isolated island" and thus share the information. This paper introduced the enterprise application integration model. In addition, it discussed the integration of each management system in colleges made by Service-Oriented Architecture. It realizes the connection between each management system and the data exchange through packing the original management system into services with Web Service technology and making announcement, search and binding.

2. The current situation of information system in colleges

As for the current management system in colleges, it is made up of by the following parts: educational management system, school running management system, personnel management system, financial management system, science and research management system, assets management system, and library management system and so on. The foundation of these information systems have strengthened the information level of the schools and improved the running efficiency of the functional departments. Some of the systems have even become the core to support the school services. However, these information systems as well have some deficiencies universally. The deficiencies are shown as follows:

(1)There is a lack of overall planning between different department systems. The lack of overall planning between different departments systems not only gives rise to barriers to form a unification of the cognitions on the school information resources, but also affects the comprehensive application abilities of the data resources.

(2)The information isolated island is formed and the data is hard to share. When the data is shared between different information systems, artificial transformation is needed to carry out the data form and the data system. This has added the difficulties and the complexities for the data sharing within the system. In addition, the information that has repeated the others and is unnecessary from different departments can hardly renew at the same period of time. This has resulted in a further inconsistency of the data.

(3)Heterogeneous environment: the exiting information systems in institutions of higher learning have been equipped with different system structures. The operation platform, database system and development technology used are of great differences as well. Therefore, such kind of heterogeneous environment has added the difficulty and costs for the application integration.

With the continuously thoroughness of the information application, the information interaction within the colleges and between the college and exterior information has entailed severe requirements. It is a quite important engineering work to integrate the previous and successive constructed information system and the digital school foundation platform in the current process of digital college construction. In addition to this, to construct an information integration sharing system is as well important.

3. System structure that faces services

3.1. Basic concept of SOA

SOA is a kind of architecture model. It connects the services through definition interface and agreements. It has greatly made use of the services in the application program in order to cope with frequently changing requirements and make rapid and efficient response.

There are mainly three participants in the SOA system, which are the service provider, the service request and the service register center. In addition, there are three kinds of operations among the three participants, which are publishing, searching and binding. As is shown in Picture 1, the service provider submits the description of the Web service to the service register center.

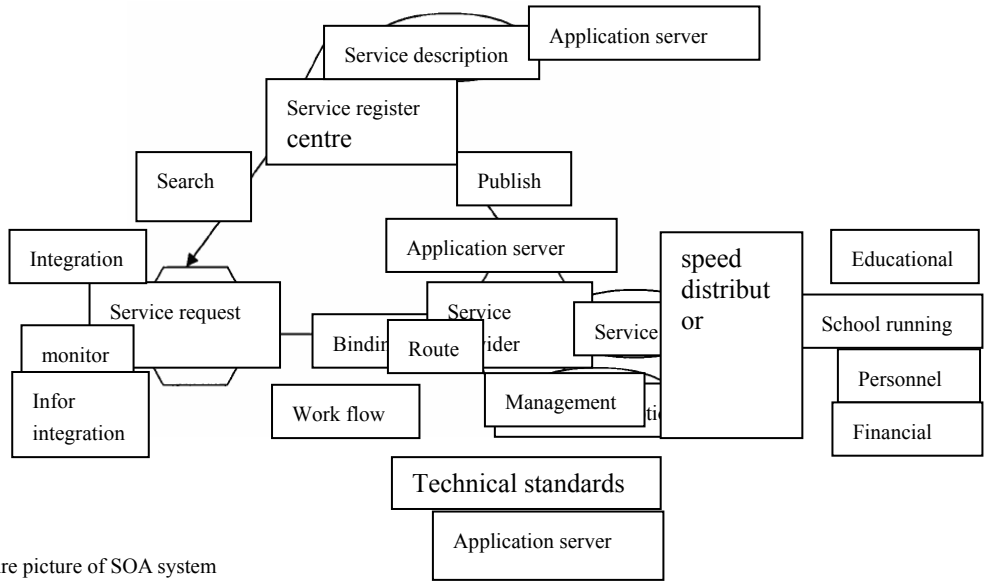

Figure 1: Structure picture of SOA system

3.2 SOA key technologies

The current Web Services is one of the main technologies. Web Services use XML to do data destruction and exchange.

3.3 College application integration

3.3.1 College application integration framework

We connected part of the information system and data in college with Web Services. The system integration framework is shown in Picture 2.

3.3.2 Service function analysis

(1)Service providers: Educational management system, school running management system, personnel management system, etc. They have acted as the service providers.

(2) Service consumers: In the application framework, part of the systems acts as the service providers as well as the service consumers.

(3) Service register center: Service consumers can find service and acquire service here.

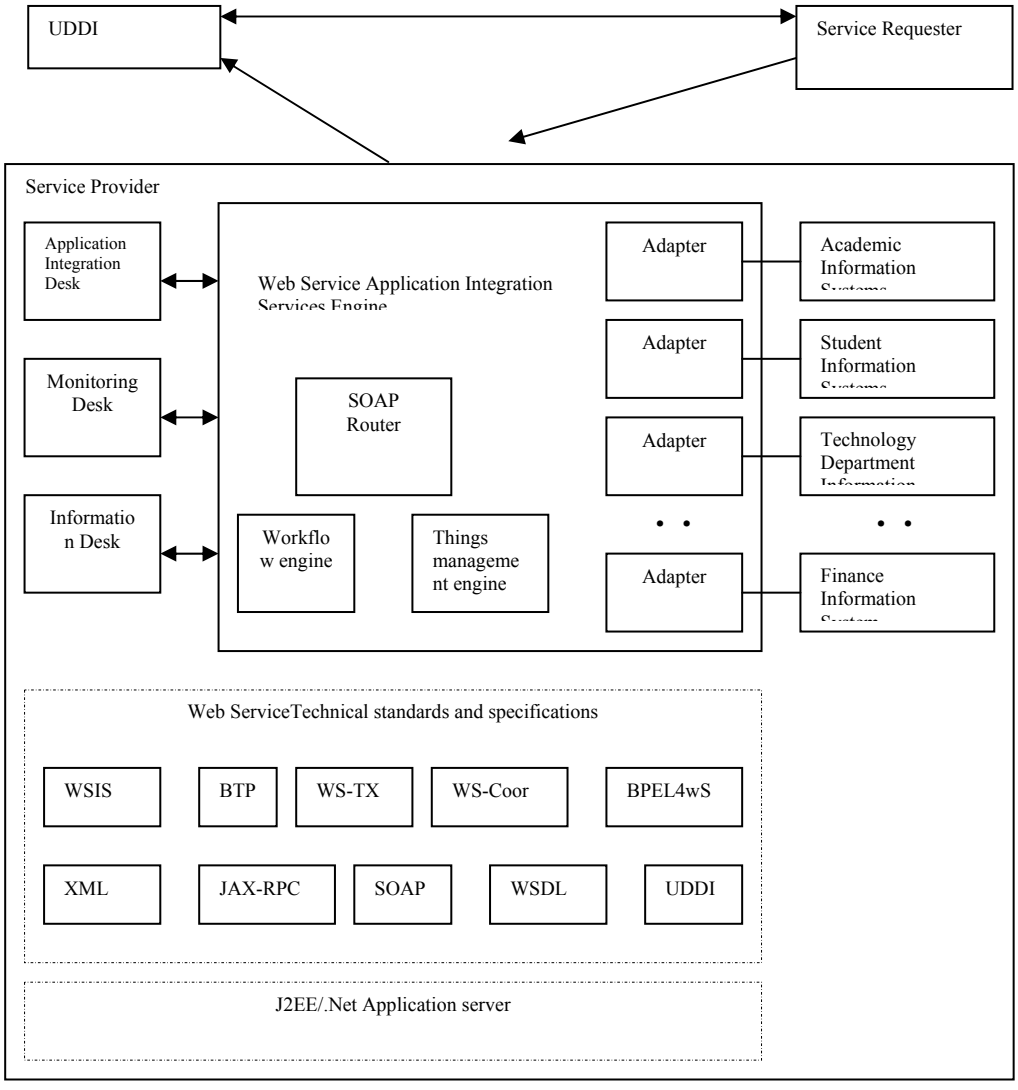

Figure 2: system integration framework

3.3.2 Service realization

Take the educational management system in Nanchang University as an example.

```
Public class WSCourseContro1Stub
{
publie WSCourseContro1Stub()
{
m_httpConneetion = new OraeleSOAPHTTPConneetion();
m_smr=new SOAPMappingRegistry();
Beanserializer beanSer=new Beanserializer();
m_smr.mapTypes(Constants.NS_URI_SOAP_ENC，new
QName(“http:// ncu.edu.cn//CourseControl.xsd”，
“CoursejavaBean” )，
CoursejavaBean.elass，beanser，beanser);
```

```
}
Publie CoursejavaBean[] getCourseByName() throwsException
{
URL endpointURL=newURL(“http:// ncu.edu.cn:7777/Course
Ctrl_Model_context_root/WSCourseControl”);
Cal1 call=new Call();
cal1.setSOAPTransport(m_httpConnection);
//distance subject for distance management
call.setTargetobjectURI(“WSCourseControl“);
Call.SetMethodName(”getCourseByName”):
call.setEncodingStyleURI(Constants.NS_URI_SOAP_ENC):
Vector params = new Vector():
call.setParams(params):
call.setSOAPMappingRegistry(m_smr):
//distance mehod
Response response = call.invoke(endpointURL,””):
if(!response.generatedFault()){
      Parmaeter result = response.getReturnValue():
      returnVal = (CoursejavaBean[])result.getValue():
      }else{
      Fault fault = response.getFault():
      throw newSOAPException(fault.getFaultCode(),fau1t.getFaultstring());
      }
      returnreturnVal
```

4. Conclusions

Most of the universities have adopted the heterogeneous management system. However, the existence of “information isolated island” has made the work difficult. This paper put forward an information integration model based on SOA. The integration framework is proved to be practical and efficient.

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